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In Cooperation With  
Rancho Santa Ana  
Botanic Garden



# Species Management Guide for *Orobanche valida* Jepson ssp. *valida*



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# Species Management Guide

for

*Orobanche valida* Jepson  
ssp. *valida*

Angeles National Forest

January 1997

Prepared by:

Orlando Mistretta  
Orlando Mistretta  
Botanist, Rancho Santa Ana Botanic Garden

1/27/97  
Date

William J. Brown Jr.  
William J. Brown Jr.  
Forest Biologist

02/18/97  
Date

Reviewed by:

Merilee E. Magias  
Resource Staff Officer

Feb 25, 1997  
Date

Approved by:

Michael J. Rogers  
Michael J. Rogers  
Forest Supervisor

3/5/97  
Date









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## **1. Introduction**

In addition to their many other resources, National Forest Lands are now recognized as the greatest repository of the Nation's biological diversity. As this resource continues to grow in value, the necessity of conserving biological diversity has assumed appropriate prominence in Forest Service policy. Inevitable conflicts may arise between traditional resource utilization, current Forest Service land management activities, and the preservation of species. Management direction must be established which protects vulnerable species. Species recognized by the Forest Service as needing special consideration are designated as Sensitive by the Regional Forester. In addition to directly avoiding negative impacts to sensitive species, the Forest Service also seeks to provide opportunities, when possible, for improving the viability of sensitive species, with the ultimate objective of removing such species from sensitive species designation. Such proactive management requires an understanding of species biology, ecology and specific habitat requirements. This species management guide summarizes existing information on the species, and establishes management criteria that will protect and enhance species viability. The species management guide has the following objectives:

- Identify distribution and abundance of the subject species.
- Summarize existing biological information.
- Summarize existing and potential resource management conflicts.
- Define management direction.

It is clear that our ability to manage a species successfully increases along with our understanding of the species. Therefore the biological information contained in the management guide constitutes an integral part of the management process. Most significantly, this information serves to identify the deficiencies in our current understanding, so that management efforts can be directed to correct those deficiencies in the context of current management prescriptions. Those familiar with the species in the field are most likely to make valuable contributions to our future understanding. Additional information gathered from the experiences of management personnel will help revise management policy in the future.



The Rock Creek broom-rape, *Orobanche valida* Jepson ssp. *valida*, is currently on the Sensitive species list of the Angeles National Forest. The Rock Creek broom-rape is known only from the San Gabriel and Topatopa mountains. This management guide summarizes available information and knowledge concerning the Rock Creek broom-rape and identifies the procedures needed to conserve and enhance this species. This guide will be updated periodically as new information is obtained.

## II. Biological Information

### A. Description

The genus *Orobanche* (Broom-rape) comprises approximately 140 species distributed throughout the world, with strongest representation in temperate Eurasia (Heywood 1978). It is the largest of 14 genera in the Broom-rape family (Orobanchaceae). The family is also treated as the subfamily Orobanchioideae of the Figwort family (Scrophulariaceae), because the structure of the flowers in the two families is very similar (Thorne 1992). Seventeen species within the genus *Orobanche* are known from the state of California (Hickman 1993). Approximately 6 species of *Orobanche* are thought to occur on the Angeles National Forest.

The broom-rapes are parasitic flowering plants. They lack chlorophyll or green pigmentation, and depend completely on a host species for their nutritional needs. Because they lack chlorophyll, they are usually dark, yellow or flesh toned in coloration.

Rock Creek broom-rape is brownish-purple in color. It forms basal, root-like growths (haustoria) that attach themselves to the lateral roots of nearby host shrubs. Above ground parts consist of a fleshy, upright stem that produces reduced, scale-like leaves and a dense, brownish-purple spike of flowers. Plants range from about 10 to 30 centimeters in length, with about half of the total length above ground. The flowers consist of fused petals forming a flower tube 12-14 millimeters long. The upper lips of the flower tube is purple, the lower lip is yellowish. The lobes have a dark purple mid-vein. The preceding description is taken from Armstrong (1983) and Munz (1974). Because of its dark coloration, small size, and preferred habitat (often beneath shrubs of chaparral species), Rock Creek broom-rape can be easily overlooked.





## B. Look-alikes

Two other broom-rape species known from the Angeles National Forest

*Orobanche parishii* (Jepson) Heckard ssp. *parishii* and *O. corymbosa* (Rydb.) Ferris, bear a superficial resemblance to Rock Creek broom-rape. *Orobanche parishii* ssp. *parishii* produces a spike-like inflorescence like Rock Creek broom-rape. It is distinguished by having a yellow to straw colored rather than purplish flower tube. The flower is also longer (18-25 millimeters compared with 12-14 millimeters in Rock Creek broom-rape). In Rock Creek broom-rape, the pedicels (stalks of individual flowers) are usually not more than 1 centimeter in length, whereas in *O. parishii* ssp. *parishii* they can be up to 5 centimeters in length. Also, the anthers in Rock Creek broom-rape are glabrous (without hairs). They can be glabrous or hairy in *O. parishii* ssp. *parishii*. *Orobanche corymbosa* is distinguished from Rock Creek broom-rape by having a flower tube 20-30 mm. long, pedicels up to 3 cm. and woolly anthers. In addition, the flowering stalk of *O. corymbosa* is usually well branched, and there is a thickening of tissue at its base. These distinguishing features are compared and summarized in the table below.

**Table I**

Comparative features of *Orobanche valida* ssp. *valida*, *O. parishii* ssp. *parishii*, and *O. corymbosa*

	Rock Creek broom- rape ( <i>Orobanche</i> <i>valida</i> ssp. <i>valida</i> )	<i>Orobanche parishii</i> ssp. <i>parishii</i>	<i>Orobanche</i> <i>corymbosa</i>
flower tube color	purplish	yellow-straw	purplish
flower tube length	12-14 mm.	18-25 mm.	20-30 mm.
pedicel length	up to 1 cm.	up to 5 cm.	up to 3 cm.
anther hairiness	glabrous	glabrous to hairy	woolly
thickened base	no	no	yes



### C. Distribution and Habitat

As currently circumscribed, two subspecies of *Orobanche valida* are recognized (Hickman 1993); Howell's broom-rape (*O. valida* ssp. *howellii*) and Rock Creek broom-rape (*O. valida* ssp. *valida*). Howell's broom-rape is known from rocky, volcanic and ultramafic slopes in open chaparral, in the mountains of California's North Coast Range (Heckard and Collins 1982). Rock Creek broom-rape is known from at least one station in the Topatopa Mountains of western Ventura County, and from approximately eight stations in the central and eastern San Gabriel Mountains. In the San Gabriel Mountains, the taxon is known from both the coastal and desert slopes.

There is a large geographic disjunction between the single station in the Topatopa Mountains and the remainder of the known localities in the San Gabriel Mountains, and a dramatic geographic disjunction (600 kilometers) between the two recognized subspecies. The two subspecies are distinguished by the length of the trichomes (hairs) on the flowering parts, the size of the flowers, the size of the plants and the thickness of the flowering parts. In the Topatopa Mountains, Rock Creek broom-rape was known until recently from a single herbarium sheet. The two specimens on this sheet are apparently intermediate in their features between Rock Creek broom-rape and Howell's broom-rape (Heckard and Collins 1982). A more recent collection from the Topatopa Mountains (*Danielsen s.n.*) has not been compared with other herbarium specimens of the taxon. Given the distance between known localities in the San Gabriel and Topatopa Mountains, and the existence of ample potential habitat between these localities, it seems likely that additional populations of the taxon occur in the Topatopa and San Gabriel Mountains.

Rock Creek broom-rape is found in mid-elevation chaparral associations. The chaparral is generally fairly open, with frequent sunny openings between dominant woody species. Common associated woody species include: silk tassel (*Garrya veatchii* and *G. flavescens*), Yerba santa (*Eriodictyon trichocalyx* var. *trichocalyx*), California buckwheat (*Eriogonum fasciculatum* vars. *polifolium* and *foliolosum*), Spanish bayonet (*Yucca whipplei*), Scrub oak (*Quercus john-tuckeri*), canyon live oak (*Quercus chrysolepis*), desert needlegrass (*Acnatherum speciosum*), mountain mahogany (*Cercocarpus betuloides*), chaparral whitethorn (*Ceanothus leucodermis*), chamise (*Adenostema fasciculatum*) and pinyon pine (*Pinus monophylla*).



The substrates at most localities are granitic in origin. However, several populations that have been recently located have soils derived from other parent materials (see Appendix I). The soils at all known sites are similar in texture. They are coarse, well drained, primarily mineral, and relatively deep. Sometimes, there is a thin layer of decomposing organic duff overlaying the mineral soils. All known localities are from moderate to steep southerly facing exposures.

#### D. Endangerment Status

The endangerment status of Johnston's buckwheat has been assessed by the California Native Plant Society (CNPS) [Skinner and Pavlik 1994] and the Federal Government as follows:

CNPS List .....	1B
CNPS R-E-D code .....	3-2-3
Federal status .....	Forest Service Sensitive

Rock Creek broom-rape has not been listed as rare, threatened or endangered by the State of California. For list and code explanations, see Appendix II. :

#### E. Nomenclatural History

*Orobanche valida* Jepson ssp. *valida*  
*Orobanche ludoviciana* Nutt. var. *valida* (Jeps.) Munz 1930  
*Orobanche valida* Jepson (1929)

#### F. Natural History

##### 1. Background information

As mentioned above, Rock Creek broom-rape is a parasite. Within the genus, a large number of flowering plants are known to serve as host species. Rock Creek broom-rape also appears to parasitize a number of species, although it was not encountered with equal frequency on these host species. Based on recent field observations, silk tassel species (*Garrya veatchii* and *G. flavescens*) were the preferred or primary hosts, followed by (in order of frequency); Yerba santa (*Eriodictyon trichocalyx* var. *trichocalyx*).



California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), desert needlegrass (*Acnatherum speciosum*), scrub oak (*Quercus john-tuckeri*), canyon live oak (*Quercus chrysolepis*) and mountain mahogany (*Cercocarpus betuloides*). In one instance, *Phacelia ramosissima* also appeared to be serving as host. While Rock Creek broom-rape was noted on the other species listed above, it was always more frequent on silk tassel species in each population surveyed, and was never observed without silk tassel species in the vicinity.

## 2. Reproduction/Breeding System.

Many members of the genus *Orobanche* are annual plant species (Heywood 1978). However, Rock Creek broom-rape may be a perennial, although an individual flowering stalk will persist for only a single growing season. There is usually one, but may be several, flowering stalks on a single plant, each with numerous flowers. Each flower, in turn, is capable of producing thousands of minute seeds. The seeds of *Orobanche* are considered some of the smallest in the plant kingdom. This small size may facilitate movement of the seeds down through the soil and into contact with the roots of host species (Armstrong 1983). Reproduction by seed is probably the primary, and perhaps, only method of reproduction for Rock Creek broom-rape. No reproduction by vegetative means has been reported or observed.

There is no information on the breeding system of the Rock Creek broom-rape. In its flowering parts, the taxon retains the bilateral symmetry and general floral morphology of typical members of the Figwort family (Scrophulariaceae) and related families. This floral morphology is an obvious evolutionary adaptation to insect mediated pollen transfer, or reproductive outcrossing. However, many species have additional adaptations which allow for the possibility of selfing, or inbreeding. The mode of reproduction (outcrossing vs. selfing) often influences the distribution of genetic diversity among populations of a species, with important conservation implications.

## 3. Growth and Longevity

It is not known what signal or suite of environmental signals are necessary to induce seed germination in Rock Creek broom-rape. Studies on other broom-rape species demonstrated a strong seasonal pattern in germinability in relation to rainfall and soil





temperatures (Van Hezewik et al. 1994). Chemical signals in the soil environment, particularly those volatilized by fire, may also trigger a germination response (Smith & Van Staden 1995). Critical to the successful establishment of a broom-rape seedling is the development of a connection with the root system of a host species. This is accomplished by the development of a haustorium, or root-like projection, between the parasite and its host. It is through the haustoria that food and nutrients flow from the host to the developing parasite.

Rates of growth in Rock Creek broom-rape are unknown. The inflorescence, or flowering stalk, can develop to a height of 15 centimeters above the ground. It is at its greatest development in mid-June to mid-July, when most of the flowering occurs. The inflorescence withers soon after flowering, and the plant goes dormant or dies shortly thereafter. Dead flowering stalks can be observed late into the fall and even winter months. There is no information on how long an individual plant persists. As mentioned, many of the species in the genus *Orobanche* are annual plant species, but Rock Creek broom-rape appears to be perennial, persisting at least beyond the first growing season. This assumption is based on the thickened size of the underground portion of the plant.

#### 4. Dispersal

The very minute size of the seeds may facilitate their dispersal by wind, although the seeds are released near the ground level and long distance transport would be unlikely under these conditions. The capsules containing the seeds dehisce (split open) at maturity, and therefore do not aid in the long distance dispersal of seeds in the way a capsule or fruit used as a food by animals often does.

#### 5. Population Demographics

Because there is no information regarding longevity of individuals, there has been no effort made to document population demographics of Rock Creek broom-rape. The little information available on two populations indicate that these populations have been more or less stable over the last two decades. The estimated size of the population on the South Fork of Big Rock Creek in the years 1979, 1982 and 1995 was 50, 100 and 300 individuals, respectively. Similarly, the estimated size of the population on Lookout Mountain for the same three years was 35, >40 and 200 individuals.



## 6. Predators and Pathogens

No information on predators and/or pathogens has been reported. Rock Creek broom-rape itself is a pathogen of those species it is capable of parasitizing. Other broom-rape species have been noted as pests on several varieties of flowering crop plants, including common vetch, broad beans, lentils, tomatoes, sunflowers and tobacco; and can significantly decrease crop yield. *Orobanche cooperi*, a species closely related to Rock Creek broom-rape) has been reported on tomato plants in the Imperial Valley (Munz 1974). There have never been any efforts to determine the degree to which parasitism by broom-rape in natural ecosystems may effect the health, longevity, or reproductive success of host species.

## III. Effect of Land Use Activities

### Historical context.

The South Fork of Big Rock Creek locality is the type locality for Rock Creek broom-rape. The taxon was originally described by Willis Jepson (Jepson 1929) from a herbarium specimen collected from this site by Frank W. and Mabel B. Peirson in 1928 (Peirson & Peirson 7937). Rock Creek broom-rape was first collected from the Lookout Mountain locality by Ivan Johnston in 1928 (Johnston 5290). The continued presence of the species at these two localities was confirmed by Wayne P. Armstrong in 1979. These sites were visited again by Orlando Mistretta in 1991 and 1994. A collection from 1940 (collector unknown) provides locality data as "San Gabriel Mountains: San Gabriel Divide". The locality description does not provide enough precision to re-locate the collection site, but may be in the vicinity of the newly vouchered "Glendora Ridge" site (Mistretta 1956).

Rock Creek broom-rape was first known from the Topatopa Mountains in western Ventura County from a collection by Dudley and McGregor (Dudley and McGregor 121, 4-6 June 1908). A recent collection from the head of Santa Paula Canyon (Danielsen s.n., 1993) confirmed the continued existence of the taxon in the Topatopa Mountains. It is not known if this locality is the same as that represented by the 1908 collection.

Historically, there has been no obvious conflicts between land use patterns and the existence of Rock Creek broom-rape. The steep, chaparral covered slopes and the unstable



terrain that characterize the habitat of the taxon have not been heavily utilized for purposes other than watershed protection. Perceived and potential threats to individual populations are discussed below.

#### **IV. Survey Information.**

##### **A. Plant Survey Results.**

In recent years, the two previously known localities (South Fork of Big Rock Creek and Lookout Mountain) were surveyed for Rock Creek broom-rape. Additional surveys for the taxon in 1994 and 1995 resulted in the discovery of six new localities in the eastern San Gabriel Mountains. The potential habitat for the taxon is extensive, and only a very small percentage has been surveyed. The known localities in the San Gabriel Mountains are concentrated in the eastern portion of the range. Given the existence of Rock Creek broom-rape in western Ventura County (Topatopa Mountains) it seems likely that the taxon would also occur in the western San Gabriel Mountains as well as other locations within the Western Transverse Ranges. However, it has not been found in these areas to date.

A summary of the known localities of Rock Creek broom-rape is provided in Table II. Nine localities of the taxon are known, eight in the San Gabriel Mountains and one in the Topatopa Mountains. Approximately 1600 individuals are estimated to occur among these localities. Approximately 1500 individuals, or 94% of the total, occur among the San Gabriel Mountain populations. Distribution maps and site specific information for the eight localities on the Angeles National Forest are provided in Appendix I.

##### **B. Threats**

While populations of Rock Creek broom-rape are generally remote and not subject to direct impacts as a result of current management practices, notable exceptions are provided below. In addition, any management practices that would affect the persistence or stability of the chaparral vegetation associated with most of the Rock Creek broom-rape populations would pose a threat to the survival of those populations. Each known population is listed below, along with perceived or potential threats at each locality.



## Horse Canyon

The proximity of this population to the Horse Canyon Shooting area renders it vulnerable. Activity associated with shooting areas often results in degradation of native habitat. Direct impacts include destruction of vegetation by shooting and trash accumulation as well as vehicle and foot traffic. Secondary impacts include invasion of alien species following destruction of native vegetation, and disruption of historical ecological regimes by large scale disturbances, such as increased fire frequency. The Horen Canyon shooting area is currently closed.

## Lookout Mountain

No apparent threats are known from this site. There is infrequent traffic along the eastern ridge of Lookout Mountain. It is likely there is less traffic today than in former years when there was a manned fire lookout station on the summit of Lookout Mountain.

## South Fork Big Rock Creek

Trail maintenance activities pose a potential threat to this population. However, there is no reason to suspect that the foot traffic associated with the trail has been detrimental to the population. The population appears to have been at least stable throughout the last 70 years, and the current trail has been in use at least as long.

## Big Rock Creek Number 1

No apparent threats were observed

## Big Rock Creek Number 2

Trail maintenance activities pose a potential threat.

## Lower South Fork

Trail cutting is causing considerable erosion to the slopes at the site of this population. Trail maintenance activities also pose a potential threat.





## Devils Punchbowl

Trail maintenance activities pose a potential threat.

## Glendora Ridge

Although the road adjacent to this population is not currently maintained, renewed maintenance activities could damage or destroy the population. Desert crested wheatgrass, an introduced perennial grass, is well established along the old roadbed, and could damage habitat if it spreads into surrounding vegetation. This Rock Creek broom-rape population is just within the boundaries of the San Dimas Experimental Forest. The vegetation of nearby areas has been altered by introduction of species such as desert crested wheatgrass, Coulter pine and other conifer species. Manipulation of natural vegetation could have an adverse effect on Rock Creek broom-rape.

## V. Management Direction

### Recommendations: General

Review Forest Plan for management prescriptions at each of the known localities. If management prescriptions appear to conflict with maintenance of Rock Creek broom-rape populations or stability of habitat, modify management prescriptions.

Alert trail maintenance crews to the presence of sensitive plant habitat at those sites where Rock Creek broom-rape is known to occur. Avoid any major displacement of substrate at those sites.

Establish a low level monitoring program to review the status of the populations at accessible sites. This could consist of a simple count of individuals at these sites at a 3 to 5 year interval.

### Recommendations: site specific

#### Horse Canyon.

Rock Creek broom-rape has been identified from a portion of the canyon near the upper end of the designated shooting area. As mentioned above, the shooting area is



currently closed. Permanent closure of the upper end of Horse Canyon, to protect Rock Creek broom-rape and habitat, should be considered. A higher level monitoring program may be appropriate to insure that the population at this site is stable, and that the integrity of the site is maintained.

#### Lower South Fork

Erect barriers along the trail in the vicinity of the Rock Creek broom-rape population to prevent trail cutting of switchbacks and subsequent erosion of slope at this locality.

#### VI. Action Plan

Currently it is the Angeles National Forest policy to require sensitive plant surveys for all ground disturbing activities. The following additional activities should be accomplished within specified time lines:

##### Year one (1996):

1. Develop a monitoring plan/strategy for Rock Creek broom-rape. Short-term (1-5 years) emphasis of the monitoring plan will be to establish baseline information on the status and condition of known Rock Creek broom-rape populations. This information will then be used to establish and implement a long-term monitoring strategy. The monitoring plan will be developed jointly between Rancho Santa Ana Botanic Garden (RSA) and the Forest Service.
2. Further investigate site specific management conflicts and threats as discussed under "Threats".
3. Review Forest Management Plan Prescriptions at each of the known localities.
4. Coordinate management recommendations and concerns with Forest Recreation Staff. Alert trail maintenance crews to the presence of sensitive plant habitat at those sites where Rock Creek broom-rape is known to occur.



Year Two-Four :

1. Implement monitoring plan for Rock Creek broom-rape.
2. Meet annually with RSA to discuss the results of the monitoring effort and effectiveness of management recommendations.
3. Where appropriate, construct barriers along trail segments with known Rock Creek broom-rape populations where trail cutting and/or trampling by hikers is adversely impacting those populations.
4. Annually, coordinate management recommendations, concerns, and monitoring results with Forest Recreation Staff. Alert trail maintenance crews to the presence of sensitive plant habitat at those sites where Rock Creek broom-rape is known to occur.

Year Five:

1. Meet with RSA to discuss overall effectiveness of monitoring effort and develop a long-term monitoring strategy.
2. Review status of all known populations of Rock Creek broom-rape within the Angeles National Forest. Incorporate any additional information on species distribution, abundance and threats, and management recommendations. Revise Species Management Guide as appropriate.



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TABLE II

*Orobanche valida* ssp. *valida* (Rock Creek broom-rape)

Summary of known localities

Designation	NDDB occ. No.	Location	Forest	Ranger District	No. of plants	Threats
Topatopa Mountains	none	T5N R21W sec. 16.	Los Padres	Ojai	100	None apparent
Horse Canyon	none	T3N R7W sec. 10.	Angeles	Valycrmo	30	Shooting area activities
Lookout Mountain	2	T2N R8W sec. 24.	Angeles	Mt. Baldy	200	None apparent
South Fork Big Rock Creek	1	T4N R9W sec. 33. T3N R9W sec 4 & 5	Angeles	Valycrmo	300	Trail maintenance
Big Rock Creek No. 1	none	T4N R9W sec. 27.	Angeles	Valycrmo	300	None apparent
Big Rock Creek No. 2	none	T4N R9W sec. 34.	Angeles	Valycrmo	150	Trail maintenance
Lower South Fork	none	T4N R9W sec. 28	Angeles	Valycrmo	200	Foot traffic/Trail maintenance
Devils Punchbowl	none	T4N R9W sec. 28 & 29	Angeles	Valycrmo	200	Trail maintenance
Ciclodora Ridge	none	T2N R8W, sec. 34.	Angeles	Mt. Baldy	100	Road maintenance



## **Appendix I**

*Orobanche valida* ssp. *valida* (Rock Creek broom-rape)

Specific locality data and maps



Designation: Horse Canyon

NDDB: No occurrence number.

Survey date: 4 August 1994

Surveyor: Orlando Mistretta

Locality: Horse Canyon. East slopes of drainage approximately 1.5 miles south of State Highway 2 (Angeles Crest Highway).

Elevation: 5700 ft

USGS coordinates: Telegraph Peak 7.5' USGS topographic quadrangle: T3N R7W, sec. 10; SE/4 of SE/4, NE/4 of SE/4.

Lat/long: 34° 21' 20" N latitude, 117° 35' 36" W longitude

Population size:  
30 plants

Acreage occupied:  
5 acres.

Physical features of site:  
Dry, moderate east facing slope. Substrate is deep, coarse, loose decomposed granite. Vegetation at site is fairly open chaparral association.

Associated species:  
*Garrya flavescens*, *Yucca whipplei*, *Quercus chrysolepis*, *Cryptantha muricata*, *Gilia splendens*, *Salvia columbariae*, *Eriogonum fasciculatum* var. *polifolium*, *Galium angustifolium* var. *angustifolium*, *Lotus procumbens*, *Asclepias californica*, *Acnatherum speciosum*.

Threats: The population is adjacent to and within Horse Canyon Shooting Area. Habitat degradation within the canyon bottom is evident. Shooting alleys have been cleared of natural vegetation. Exotic vegetation is replacing native vegetation in these areas, and becoming frequent in surrounding extant native vegetation. Possible disruption of natural ecological regimes due to changes in vegetation may be occurring.

Notes: The site was visited again by Orlando Mistretta, RT and Shawn Hawke on 29 June 1995. Adjacent slopes (approximately 20 acres) were surveyed for Rock Creek broom-rape. The species was encountered very infrequently over area surveyed. Most plants were found outside of the shooting area. Host plant associations were evident for *Quercus chrysolepis*, *Garrya flavescens* and *Acnatherum speciosum*.

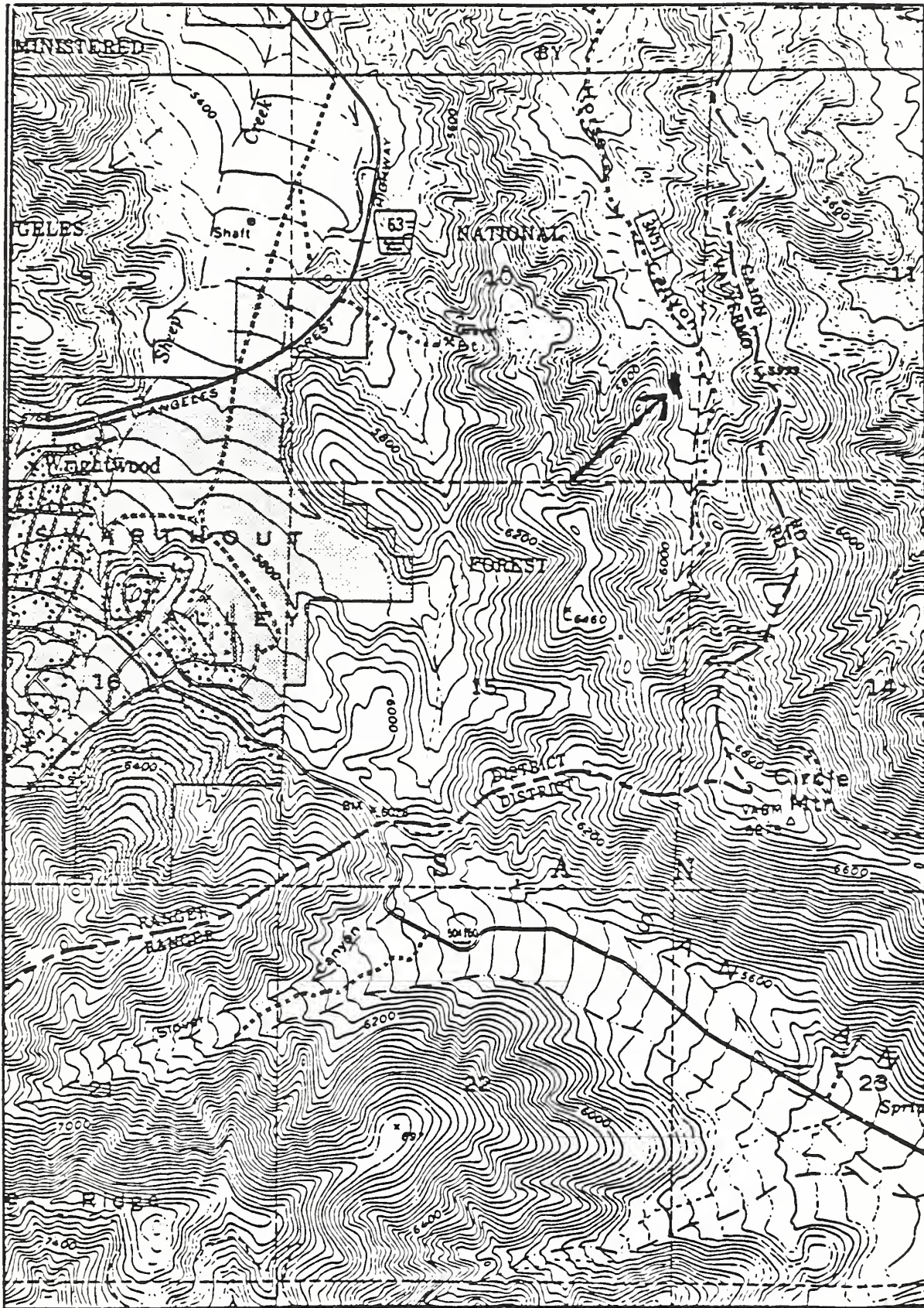


Reference herbarium voucher:

*Mistretta 1455* (RSA); *Mistretta 1852* (RSA).







*Orobanche valida* ssp. *valida*

Horse Canyon

T2N R8W sec. 10.

Telegraph Peak USGS topographic quadrangle (7.5 minute)



Designation: Lookout Mountain

NDDDB: Occurrence No. 2

Survey date: 23 June 1995

Surveyor: Orlando Mistretta

Locality: Ridge southeast of Lookout Mountain, approximately 1/3 mile from summit.

Elevation: 6000 feet (1798 meters per Armstrong 1983)

USGS coordinates: Mt. Baldy 7.5' USGS topographic quadrangle; T2N R8W, sec. 24; S/2.

Lat/long: 34° 14' 42" N latitude, 117° 40' 20" W longitude

Population size:

200 plants

Acreage occupied:

20 acres.

Physical features of site:

Dry, moderate to steep southwest facing slopes. Substrate is deep, coarse, loose decomposed granite. Vegetation at site is fairly open chaparral association

Associated species:

*Eriodictyon trichocalyx* var. *trichocalyx*, *Yucca whipplei*, *Garrya veatchii*, *Gilia capitata*, *Eriogonum fasciculatum* var. *foliolosum*, *Eriogonum davidsonii*, *Cercocarpus betuloides*, *Arabis pulchra*, *Bromus diandrus*, *Bromus tectorum*, *Cryptantha muricata*, *Eriophyllum confertiflorum*, *Ceanothus leucodermis*.

Threats: None apparent. There is a trail along the ridge up to the summit of Lookout Mountain. It is infrequently used and overgrown in many spots. Rock Creek broom-rape is located off of the ridge in inaccessible chaparral vegetation.

Notes: The slopes both southwest and northeast of the ridge were surveyed. The northeast slopes are characterized by conifer and live oak vegetation associations, and apparently are unsuitable habitat for Rock Creek broom-rape. On the chaparral covered southwest slopes, three sub-populations of Rock Creek broom-rape were located. They appeared most closely associated with *Garrya veatchii*, and their occurrence seemed to correspond to some critical density of *Garrya veatchii*. In several instances *Eriodictyon trichocalyx* var. *trichocalyx* may also have been serving as the host.



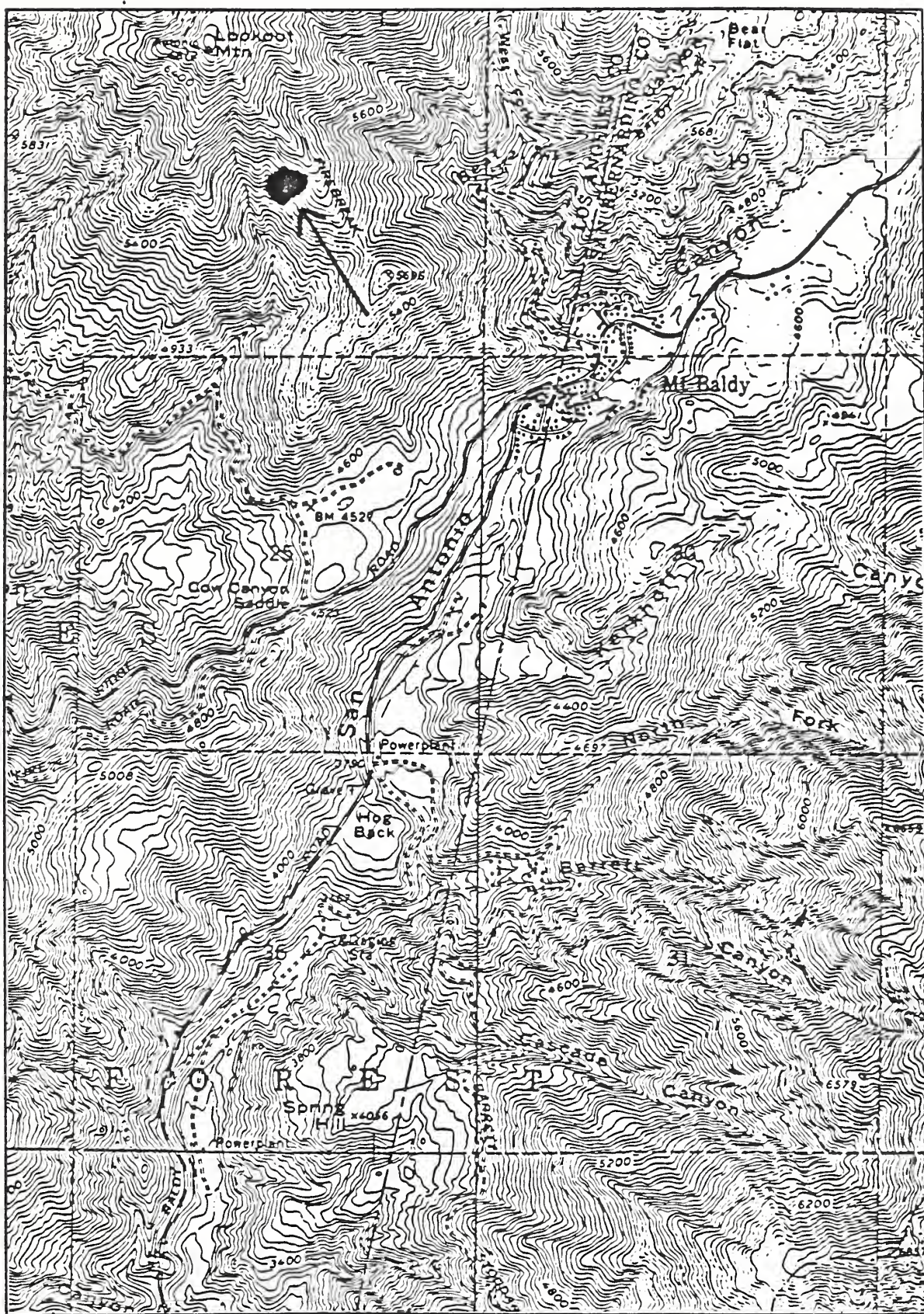
While soils were predominantly mineral without any organic cover, there were several instances where plants were located on sites with considerable organic litter accumulation, particularly leaves and twigs of *Cercocarpus betuloides*. Plants usually were found in full sun and in partial and full shade of host species (*Garrya veatchii*).

Reference herbarium vouchers:

*Johnston 5290* (RSA); *Armstrong s.n.* (JEPS); *Mistretta 1408* (RSA); *Mistretta 1824* (RSA).







*Orobanche valida* ssp. *valida*  
 Lookout Mountain (NDDB occurrence No. 2)  
 T2N R8W sec. 24.  
 Mt. Baldy USGS topographic quadrangle (7.5 minute)







Designation: South Fork Big Rock Creek

NDDDB: Occurrence No. 1

Survey date: 22 July 1994

Surveyor: Orlando Mistretta

Locality: South Fork Big Rock Creek, approximately 1 mile southwest (up canyon) from South Fork Campground.

Elevation: 5300-5600 feet

USGS coordinates: Telegraph 7.5' USGS topographic quadrangle; T4N R9W sec. 33; SE/4.

T3N R9W sec. 4; NW/4 of NW/4

T3N R9W sec. 5; NE/4 of NE/4

Lat/long: 34° 22' 48" N latitude, 117° 50' 11" W longitude

Population size:  
300 plants

Acreage occupied:  
10 acres.

Physical features of site:  
Dry, moderate to steep east and southeast facing slopes. Substrate is deep, coarse, unstable granitic talus. Vegetation at site is fairly open chaparral association.

Associated species:  
*Garrya flavescens*, *Melica imperfecta*, *Cryptantha muricata*, *Eriogonum fasciculatum* var. *polifolium*, *Yucca whipplei*, *Caulanthus amplexicaulis*, *Bromus tectorum*, *Eriogonum davidsonii*, *Eriodictyon trichocalyx* var. *trichocalyx*, *Arctostaphylos* cf. *glauca*, *Acnatherum speciosum*, *Cercocarpus betuloides*, *Ceanothus greggii* var. *vestitus*.

Threats: Potential threat from slope disturbance associated with trail maintenance.

Notes: Plants located in five discrete populations along approximately one mile of trail. Small populations are likely to occur up and downslope from trail, but slopes are steep and unstable, making surveys of slopes very difficult. The habitat in the vicinity of the trail was surveyed from the South Fork Campground to Islip Saddle.

Association with *Garrya flavescens* was very strong. In a couple of instances, *Eriodictyon trichocalyx* var. *trichocalyx* and *Acnatherum speciosum* were obvious host species.



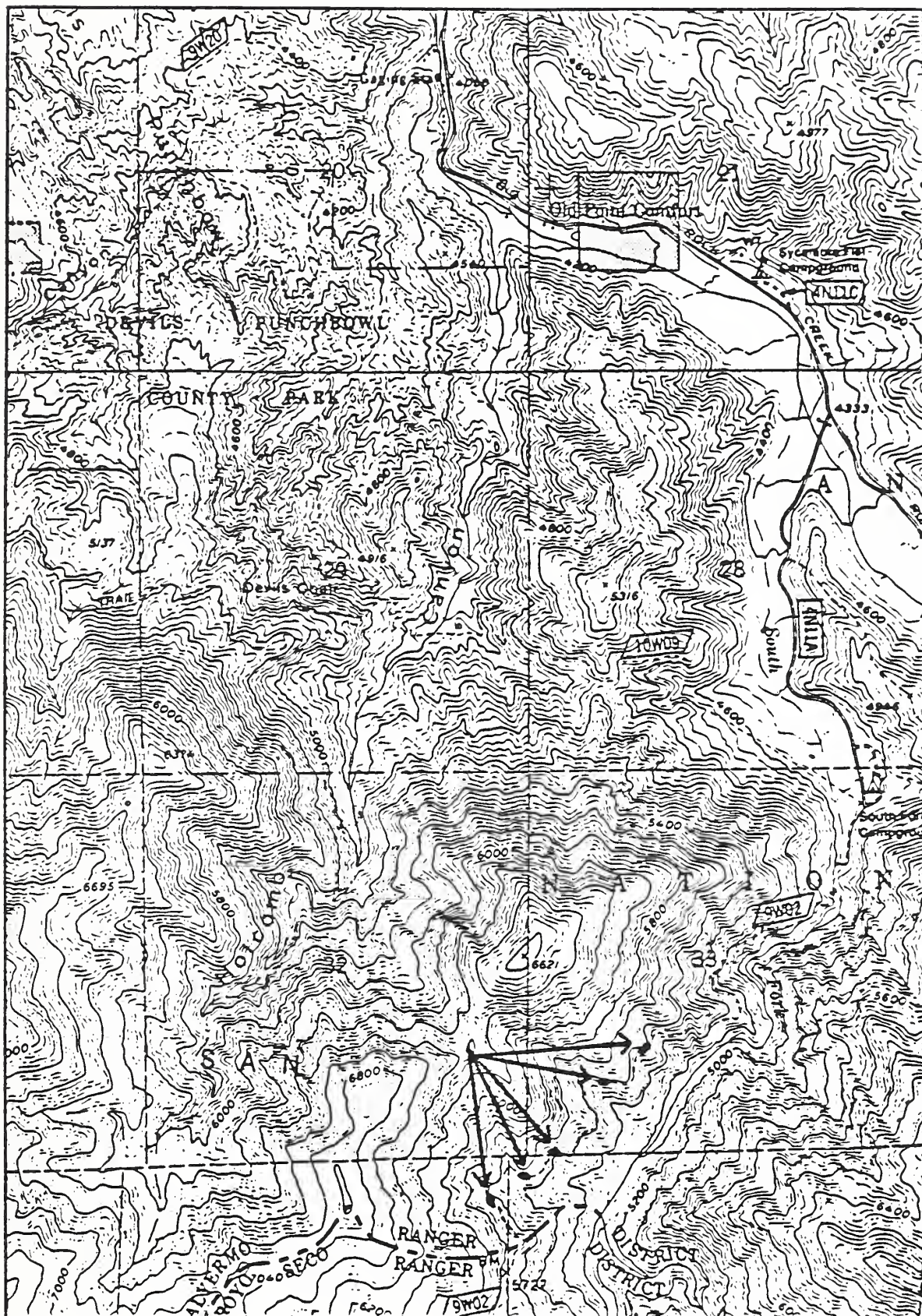
The estimated number of individuals provided above is higher than estimates provided by Armstrong (1983) in his visit to the site. Armstrong noted "at least one hundred plants above the trail". In recent observations, the majority of plants were noted below the trail. Armstrong may have made note of a sub-population not recorded in recent surveys, and extant individuals at this site are probably in the range of 300-500; perhaps many more if the surrounding habitat could be more thoroughly surveyed.

This is the type locality for the species.

Reference herbarium vouchers:

*Peirson & Peirson 7937* (RSA, JEPS); *Armstrong s.n.* (JEPS); *Mistretta 881* (RSA); *Mistretta 1449* (RSA).





*Orobanche valida ssp. valida*  
 South Fork Big Rock Creek (NDDB occurrence No. 1)  
 T4N R9W sec. 33; T3N R9W secs 4 & 5.  
 Valyermo USGS topographic quadrangle (7.5 minute)





Designation: Big Rock Creek No. 1

NDDB: No occurrence number

Survey date: 30 June 1995

Surveyor: Orlando Mistretta

Locality: Big Rock Creek, slopes south of canyon 1.0 miles southeast of confluence with South Fork of Big Rock Creek, 0.3 miles east of South Fork Campground. Slopes west and south of Paradise Springs.  
Elevation: 4800-4900 feet  
USGS coordinates: Valyermo 7.5' USGS topographic quadrangle; T4N R9W sec. 27.  
Lat/long: 34° 23' 33" N latitude, 117° 48' 32" W longitude

Population size:  
300 plants

Acreage occupied:  
10 acres.

Physical features of site:  
Dry, moderate, south and southwest facing slopes. Substrate is deep, coarse loam derived from undivided Miocene nonmarine sedimentary and Paleocene marine sedimentary substrates. Considerable leaf litter accumulation over substrate. Vegetation at site is fairly open chaparral and pinyon-juniper associations.

Associated species:  
*Garrya flavescens*, *Acnatherum speciosum*, *Quercus john-tuckeri*, *Ericameria linearifolia*, *Eriogonum fasciculatum* var. *polifolium*, *Yucca whipplei*, *Opuntia basilaris* var. *brachyclada*, *Cercocarpus betuloides*, *Galium angustifolium* var. *angustifolium*.

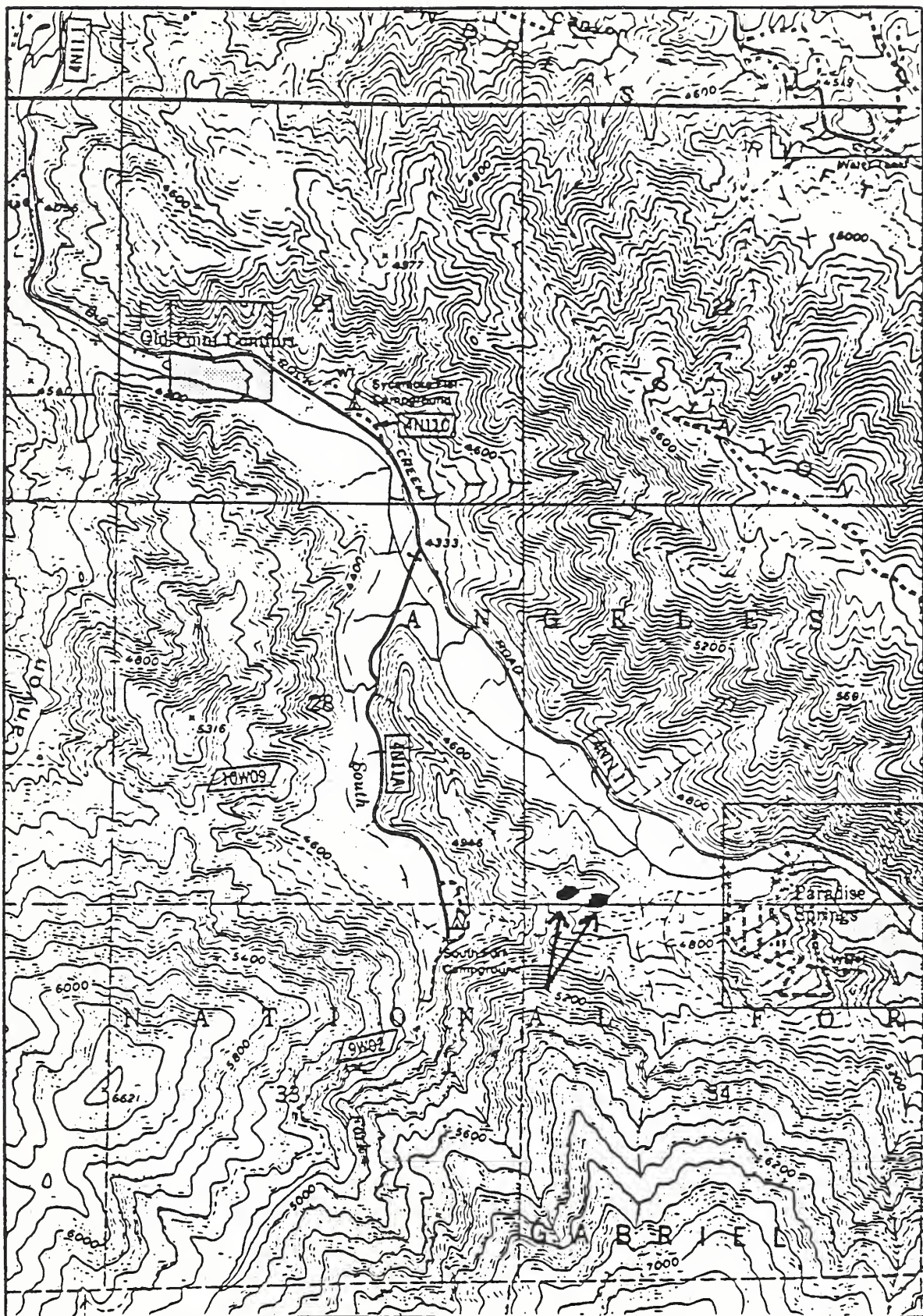
Threats: None apparent. Site is remote from established trails.

Notes: Plants located in two populations about 100 yards apart. *Garrya flavescens* was the dominant host. Also noted host association with *Quercus john-tuckeri*, *Acnatherum speciosum*, and *Cercocarpus betuloides*.

Reference herbarium vouchers:  
*Mistretta 1865* (RSA); *Mistretta 1866* (RSA).







*Orobanche valida* ssp. *valida*

Big Rock Creek No. 1.

T4N R9W sec. 27

Valyermo USGS topographic quadrangle (7.5 minute)



Designation: Big Rock Creek No. 2

NDDB: No occurrence number

Survey date: 30 June 1995

Surveyor: Orlando Mistretta

Locality: Big Rock Creek, slopes south of canyon 1.5 miles southeast of confluence with South Fork of Big Rock Creek, 1.0 miles east of South Fork Campground. Slopes south of Paradise Springs.  
Elevation: 5450 feet  
USGS coordinates: Valyermo 7.5' USGS topographic quadrangle; T4N R9W sec. 34.  
Lat/long: 34° 23' 30" N latitude, 117° 48' 30" W longitude

Population size:  
150 plants

Acreage occupied:  
3 acres.

Physical features of site:  
Dry, moderate, south and southwest facing slopes. Soil is deep, coarse loam derived from undivided Miocene nonmarine sedimentary and Paleocene marine sedimentary substrates. Vegetation at site is fairly open chaparral and pinyon-juniper associations.

Associated species:  
*Garrya flavescens*, *Arctostaphylos* cf. *glandulosa* ssp. *glaucomollis*, *Pseudotsuga macrocarpa*, *Pinus monophylla*, *Yucca whipplei*, *Acnatherum speciosum*, *Cercocarpus betuloides*, *Eriogonum davidsonii*, *Eriogonum fasciculatum* var. *polifolium*, *Keckiella ternata*, *Salvia columbariae*, *Caulanthus amplexicaulis*.

Threats: Potential threat from slope disturbance associated with trail maintenance.

Notes: Plants observed above and below trail for about 100 yards at this site. *Garrya flavescens* appeared to be the only host of Rock Creek broom-rape at this site. Continued survey up trail to Dorr Canyon. No additional plants were located.

Reference herbarium voucher:  
*Mistretta 1867* (RSA)



Designation: Big Rock Creek No. 2

NDDDB: No occurrence number

Survey date: 30 June 1995

Surveyor: Orlando Mistretta

Locality: Big Rock Creek, slopes south of canyon 1.5 miles southeast of confluence with South Fork of Big Rock Creek, 1.0 miles east of South Fork Campground. Slopes south of Paradise Springs.

Elevation: 5450 feet

USGS coordinates: Valyermo 7.5' USGS topographic quadrangle; T4N R9W sec. 34.

Lat/long: 34° 23' 30" N latitude, 117° 48' 30" W longitude

Population size:

150 plants

Acreage occupied:

3 acres.

Physical features of site:

Dry, moderate, south and southwest facing slopes. Soil is deep, coarse loam derived from undivided Miocene nonmarine sedimentary and Paleocene marine sedimentary substrates. Vegetation at site is fairly open chaparral and pinyon-juniper associations.

Associated species:

*Garrya flavescens*, *Arctostaphylos* cf. *glandulosa* ssp. *glaucomollis*, *Pseudotsuga macrocarpa*, *Pinus monophylla*, *Yucca whipplei*, *Acnatherum speciosum*, *Cercocarpus betuloides*, *Eriogonum davidsonii*, *Eriogonum fasciculatum* var. *polifolium*, *Keckiella ternata*, *Salvia columbariae*, *Caulanthus amplexicaulis*.

Threats: Potential threat from slope disturbance associated with trail maintenance.

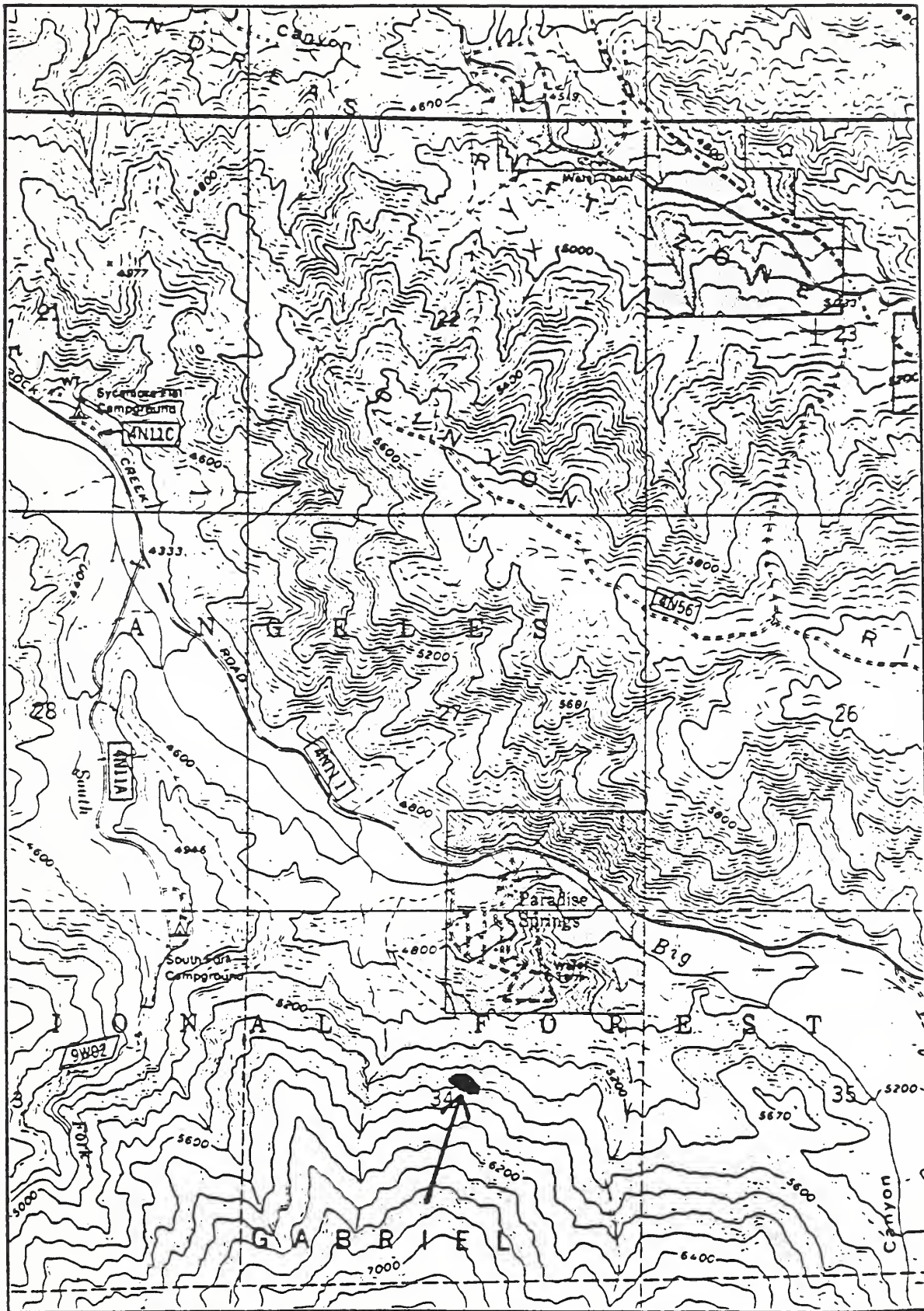
Notes: Plants observed above and below trail for about 100 yards at this site. *Garrya flavescens* appeared to be the only host of Rock Creek broom-rape at this site. Continued survey up trail to Dorr Canyon. No additional plants were located.

Reference herbarium voucher:

*Mistretta 1867* (RSA)







*Orobanche valida* ssp. *valida*  
 Big Rock Creek No. 2  
 T4N R9W sec. 34.  
 Valermo USGS topographic quadrangle (7.5 minute)





Designation: Lower South Fork

NDDDB: No occurrence number

Survey date: 6 July 1995

Surveyor: Orlando Mistretta

Locality: South Fork of Big Rock Creek, 0.75 miles northwest of South Fork  
Campground along trail to Devil's Punchbowl County Park.

Elevation: 4750-4850 feet

USGS coordinates: Valyermo 7.5' USGS topographic quadrangle: T4N  
R9W sec. 28, SW/4.

Lat/long: 34° 24' 02" N latitude, 117° 49' 46" W longitude

Population size:

200 plants

Acreage occupied:

5 acres.

Physical features of site:

Dry, moderate to steep south facing slopes. Soil is deep, coarse, mineral,  
derived from undivided Miocene nonmarine sedimentary substrate.

Vegetation at site is fairly open chaparral and pinyon-juniper associations.

Associated species:

*Garrya flavescens*, *Arctostaphylos* cf. *glandulosa* ssp. *glaucomollis*, *Pinus*  
*monophylla*, *Yucca whipplei*, *Acnatherum speciosum*, *Cercocarpus*  
*betuloides*, *Eriogonum fasciculatum* var. *polifolium*, *Eriodictyon*  
*trichocalyx* var. *trichocalyx*, *Salvia columbariae*, *Eriophyllum*  
*conferiflorum*.

Threats:

Trail cutting at this site is causing considerable erosion of slope, and is  
degrading habitat. Potential threat from slope disturbance associated with  
trail maintenance.

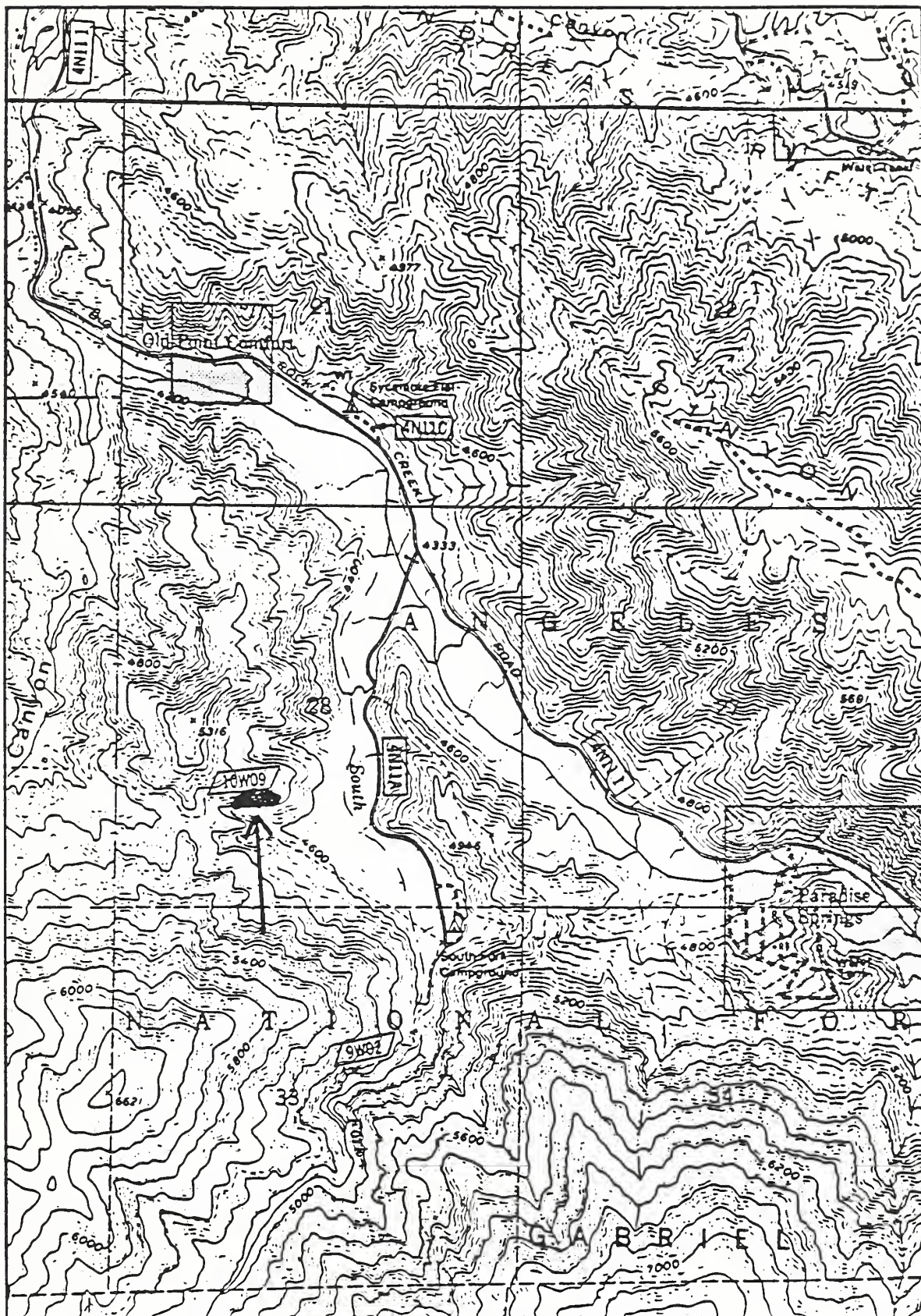
Notes:

*Garrya flavescens* was the primary host noted. Host association also noted  
with *Eriogonum fasciculatum* var. *polifolium*, *Acnatherum speciosum*,  
*Quercus john-tuckeri*, *Eriodictyon trichocalyx* var. *trichocalyx* and  
*Cercocarpus betuloides*.

Reference herbarium voucher:

Mistretta 1868 (RSA).





*Orobancha valida* ssp. *valida*  
 Lower South Fork  
 T4N R9W sec. 28.  
 Valermo USGS topographic quadrangle (7.5 minute)



Designation: Devil's Punchbowl

NDDB: No occurrence number

Survey date: 6 July 1995

Surveyor: Orlando Mistretta

Locality: Devil's Punchbowl County Park, on eastern boundary of park, 1.0-1.25 miles northwest of South Fork Campground

Elevation: 4700-4950 feet

USGS coordinates: Valyermo 7.5' USGS topographic quadrangle; T4N R9W sec. 28, SW/4; sec. 29, SE/4

Lat/long: 34° 24' 02" N latitude, 117° 50' 03" W longitude

Population size:

200 plants

Acreage occupied:

5 acres.

Physical features of site:

Located on dry, moderate southwest facing slopes. Soil is deep, coarse, loam, derived from undivided Miocene nonmarine sedimentary substrate. Vegetation at site is fairly open chaparral and pinyon-juniper associations.

Associated species:

*Garrya flavescens*, *Fremontodendron californicum* ssp. *californicum*, *Ceanothus greggii* var. *vestitus*, *Arctostaphylos* cf. *glauca*, *Pinus monophylla*, *Yucca whipplei*, *Acnatherum speciosum*, *Cercocarpus betuloides*, *Eriogonum fasciculatum* var. *polifolium*.

Threats: Potential threat from slope disturbance associated with trail maintenance.

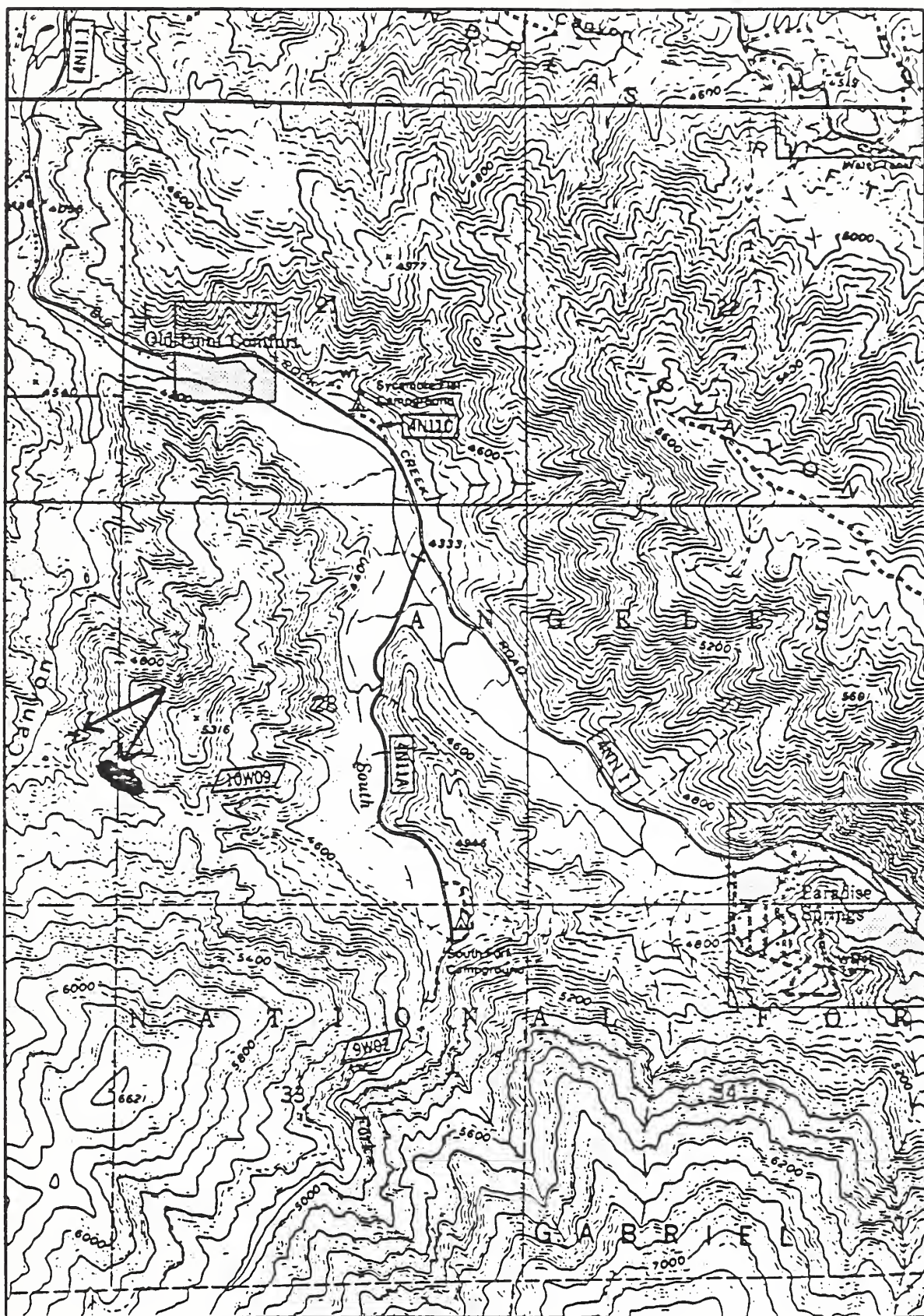
Notes: All plants appeared to be parasitic on *Garrya flavescens*. Plants were noted at several points along trail from boundary sign to about 4800 ft. elevation. One small pocket of ten plants observed at 4700 ft. Surveyed along trail and in adjacent vegetation to bottom of Holcomb Canyon.

Reference herbarium vouchers:

*Mistretta 1869 (RSA).*







*Orobanche valida* ssp. *valida*

Devil's Punchbowl

T4N R9W sec. 28.

Valyermo USGS topographic quadrangle (7.5 minute)





Designation: Glendora Ridge.

NDDB: No occurrence number

Survey date: 9 January 1996

Surveyor: Orlando Mistretta

Locality: Unmaintained fire road off of the Glendora Ridge Road, approximately 1.0 miles west of Fallen Leaf Spring  
Elevation: 4680 feet  
USGS coordinates: Mt. Badly 7.5' USGS topographic quadrangle; T2N R8W sec. 34, N/2  
Lat./long: 34° 13' 00" N latitude, 117° 42' 15" W longitude

Population size:  
100 plants

Acreage occupied:  
3 acres.

Physical features of site:  
Located on dry, moderate south and southwest facing slopes. Soil is deep, coarse, granitic loam, with a deep accumulation of leaf litter, primarily from *Quercus agrifolia*. Vegetation at site is a fairly open mesic chaparral association.

Associated species:  
*Garrya veatchii*, *Quercus agrifolia*, *Q. wislizeni*, *Lonicera subspicata* var. *denudata*, *Keckiella ternata*, *Bromus tectorum*, *Avena* cf. *barbata*, *Chrysothamnus nauseosus*, *Brickellia californica*, *Penstemon spectabilis*, *Stephanomeria virgata*, *Eriogonum fasciculatum* var. *foliolosum*, *E. fasciculatum* var. *polifolium*, *Phacelia ramosissima*, *Agropyron desertorum*, *Eriophyllum confertiflorum*, *Adenostema fasciculatum*, *Senecio flaccidus* var. *douglasii*, *Ceanothus leucodermis*.

Threats: Plants were located along an abandoned road leading to Fallen Leaf Spring. Activity associated with renewed grading or road maintenance could result in extirpation of site. Desert crested wheatgrass (*Agropyron desertorum*) has been introduced to the area, and has naturalized along the old roadbed. It does not appear to be spreading aggressively into undisturbed vegetation adjacent to the road, but could adversely affect habitat if it does.

Notes: Plants were observed at two sites along road, about 60 yards apart. Primary host appeared to be *Garrya veatchii*. Plants were also noted on *Quercus chrysolepis* and *Eriogonum fasciculatum* var. *polifolium*. One plant appeared to be on *Phacelia ramosissima*.



Soil conditions were unusual in the depth of litter accumulation, which was up to six inches.

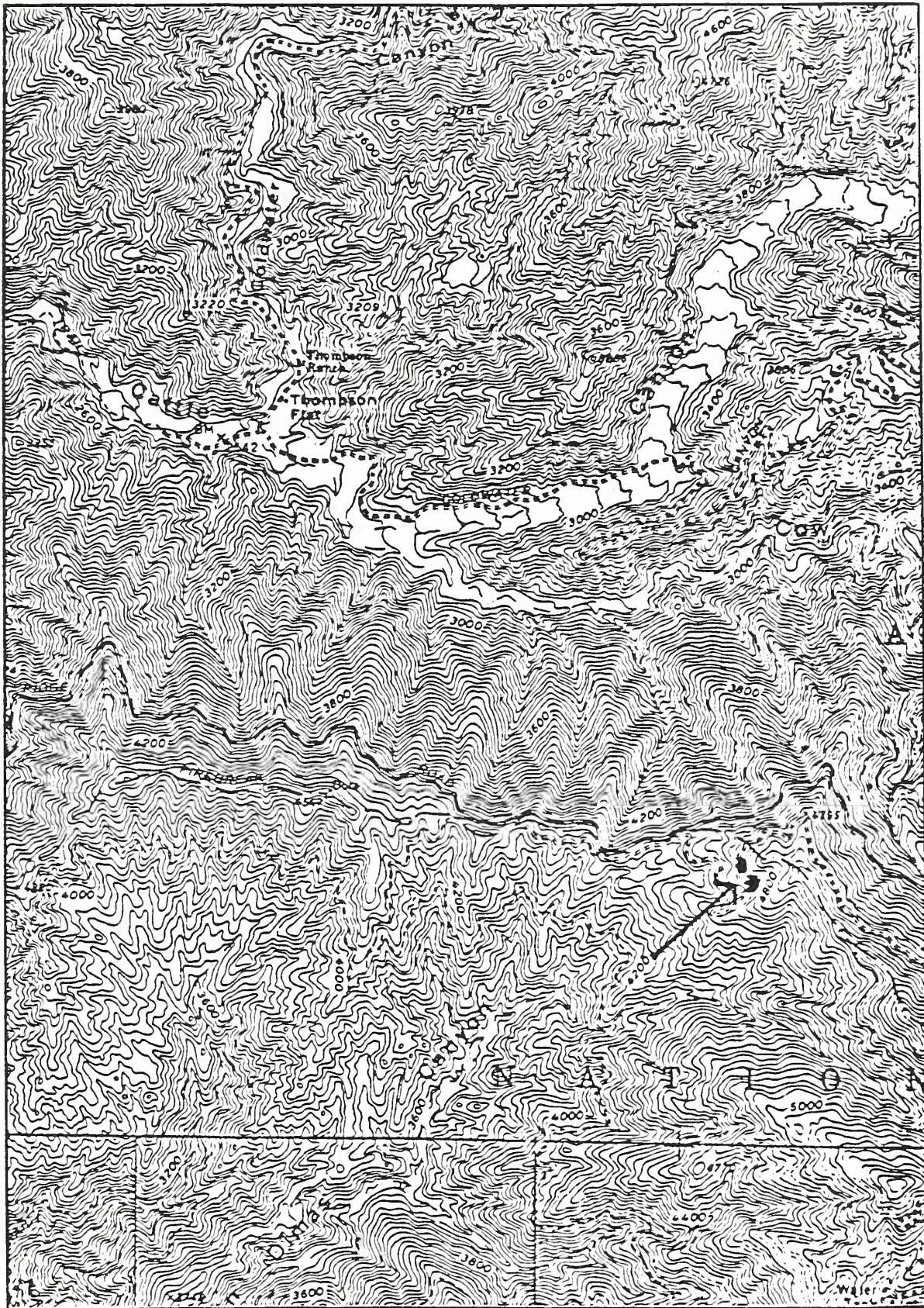
Searched surrounding vegetation and located about 5 additional plants within 50 yards of main population. Surveyed up road to junction with Fallen Leaf Spring.

Reference herbarium voucher:

*Mistretta 1956 (RSA).*







*Orobanche valida* ssp. *valida*  
Glendora Ridge  
T4N R8W sec. 34.  
Mt. Baldy USGS topographic quadrangle (7.5 minute)





## **Appendix II**

### **Codes and Abbreviations**

#### **THE CNPS LISTS**

- List 1A Presumed extinct in California
- List 1B Rare or Endangered in California and elsewhere
- List 2 Rare or Endangered in California, more common elsewhere
- List 3 Need more information
- List 4 Plants of limited distribution

#### **THE CNPS R-E-D CODE**

##### **R (Rarity)**

- 1 - Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time
- 2 - Distributed in a limited number of occurrences, occasionally more if each occurrence is small
- 3 - Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported

##### **E (Endangerment)**

- 1 - Not endangered
- 2 - Endangered in a portion of its range
- 3 - Endangered throughout its range

##### **D (Distribution)**

- 1 - More or less widespread outside California
- 2 - Rare outside California
- 3 - Endemic to California

#### **STATE-LISTED PLANTS**

- CE State-listed, endangered
- CT State-listed, threatened
- CR State-listed, rare
- CC Candidate for State listing

#### **FEDERALLY-LISTED PLANTS**

- FE Federally-listed, endangered
- FT Federally-listed, threatened
- PE Federally-proposed, endangered
- PT Federally-proposed, threatened
- CI Enough data are on file to support federal listing

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